

## PATENT COOPERATION TREATY

**PCT****INTERNATIONAL PRELIMINARY EXAMINATION REPORT**  
(PCT Article 36 and Rule 70)

REC'D 11 MAY 2004

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Applicant's or agent's file reference P-2002-019WO	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/DK 03/00636	International filing date (day/month/year) 29.09.2003	Priority date (day/month/year) 08.10.2002
International Patent Classification (IPC) or both national classification and IPC G01R31/36		
Applicant OTICON A/S et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
  
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
  - This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.
  
3. This report contains indications relating to the following items:
  - I  Basis of the opinion
  - II  Priority
  - III  Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV  Lack of unity of invention
  - V  Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI  Certain documents cited
  - VII  Certain defects in the international application
  - VIII  Certain observations on the international application

Date of submission of the demand  25.02.2004	Date of completion of this report  07.05.2004
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Rath, R  Telephone No. +49 89 2399-8950



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/DK 03/00636

**I. Basis of the report**

1. With regard to the elements of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-4 as originally filed

**Claims, Numbers**

1-7 filed with telefax on 20.04.2004

**Drawings, Sheets**

1/1 as originally filed

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.: 8,9
- the drawings, sheets:

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5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims	1-7
	No: Claims	
Inventive step (IS)	Yes: Claims	1-7
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-7
	No: Claims	

**2. Citations and explanations**

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/DK03/00636

Newly filed independent claims 1 and 5 result from the combination of originally filed claims 1 &2 and 6 & 7.

Cited documents:

- D1: US-B1-6 188 142  
D2: US-A-5 619 126

D1 describes disconnecting consumers from a voltage source.

When the voltage falls below a threshold voltage, non-critical consumers are either disconnected or receive a limited power.

D2 describes a circuit arrangement, which decreases the load current in case of low battery voltage.

Problem: to adapt the maximum power in a battery powered amplifier if the battery is weak.

Solution: in case of a weak battery to reduce the current in the amplifier in a repeated sequence. The person skilled in the art would not consider to use such a high repetition frequency higher than the highest audio frequency. Normally such load variations are performed very slowly and seldom and restricted by either delay elements or the use of a sufficient hysteresis on the voltage detection.

## CLAIMS

1. Method of current management in a battery powered amplifier in a hearing aid device, the method comprising the following steps:

5        a- comparing the actual supply voltage from the battery with a fixed reference voltage,

b- generating a control signal whenever the supply voltage is below the reference voltage,

10        c- use the control signal to reduce the load current in the battery powered device, whereby the supply voltage from the battery will increase, repeat steps a,b and c as long as the supply voltage is below the reference voltage whereby the repetition frequency of steps a,b and c is higher than the highest audio frequency of the hearing aid.

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2. Method as claimed in claim 1 where the reference voltage is above a critical supply voltage of the hearing aid.

20        3. Method of current management as claimed in claim 1, wherein the battery is a zinc-air battery.

4. Method of current management as claimed in claim 1, wherein the battery is a rechargeable battery.

25        5. Battery powered amplifier in a hearing aid device with a battery giving a supply voltage to the device, whereby means are provided for generating a fixed reference voltage and means for comparing the supply voltage with the reference voltage, and where the comparing means are arranged to deliver a control signal to the device whenever the supply voltage is below the reference voltage, and where the device has means for reducing its current load at the receipt of the control signal and whereby the comparing means are arranged to

conduct the comparing at a repetition frequency, which is above the highest audio frequency of the hearing aid.

- 5 6. A battery powered device as claimed in claim 5, where the battery is a zinc-air battery.
7. A battery powered device as claimed in claim 5, where the battery is a rechargeable battery.